Abstract Of The Disclosure

A graphics system including a custom graphics and audio processor produces exciting 2D and 3D graphics and surround sound. The system includes a graphics and audio processor including a 3D graphics pipeline and an audio digital signal processor. To achieve multi-texturing, conventional graphics rendering systems typically rely on multiple rendering passes or require multiple serial/parallel texture-retrieval/processing circuits which occupy additional chip real-estate and exacerbate memory arbitration problems. To solve this problem and to provide an enhanced repertoire of multi-texturing capabilities, a relatively low chip-footprint, versatile texture environment (TEV) processing subsystem is implemented in a pipelined graphics system by utilizing a flexible API and a hardware-accelerated programmable texture blender/shader arrangement that circulates computed color and alpha data over multiple texture blending/shading cycles (stages). The texture-environment subsystem combines per-vertex lighting, textures and constant (rasterized) colors to form computed pixel color prior to fogging and final pixel blending. Blending operations for color (RGB) and alpha components are independently processed within the TEV subsystem by a single sub-blend unit consisting of a set of color/alpha-combiner (shader) hardware that is reused over multiple processing stages to combine multiple textures. A set of four selectable current-color input/output registers which are shared among all stages is provided at the output of the sub-blend unit to temporarily store computed color results and to pass computed color between stages. Arguments for blending stage operations can be selected from: the four current-color registers, rasterized color (diffuse or specular), texture, the alpha components of the above colors, and 0 or 1. Up to sixteen independently programmable consecutive stages, forming a chain of